Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An apparatus comprising:

a first balancer to generate a first balancing signal from a first balancing parameter and a first signal of a first index corresponding to a first frequency, the first balancing parameter being calculated in a training process and the first signal being provided by a first sub-carrier demodulator operating at the first frequency; and

a first combiner coupled to the first balancer to combine the first balancing signal and a second signal of a second index corresponding to a second frequency, the second frequency being symmetrical to the first frequency with respect to a center frequency in a multi-carrier signal, the first combiner generating a first balanced signal corresponding to the second frequency.

2. (Currently Amended) The apparatus of claim 1 wherein the first balancer comprises:

a first converter to convert the first signal into a first complex conjugate; and

a first multiplier coupled to the first converter to multiply the first complex conjugate with ~~a~~ the first balancing parameter, the first balancing parameter corresponding to the first frequency, the first multiplier generating the first balancing signal.

3. (Original) The apparatus of claim 1 wherein the first combiner includes a first subtractor to subtract the first balancing signal from the second signal to provide the first balanced signal.

4. (Currently Amended) The apparatus of claim 1 wherein the first balanced signal is the same as a first desired signal free of imbalance effects, excluding scaling~~scaled~~ by a first deterministic complex factor.

5. (Canceled)

6. (Currently Amended) The apparatus of claim 4 wherein the first desired signal is ~~a first~~an ideally demodulated signal free of imbalance effects.

7. (Currently Amended) The apparatus of claim 1 further comprising:

a second balancer to generate a second balancing signal from a second balancing parameter and the second signal, the second balancing parameter being calculated in a training process; and

a second combiner coupled to the second balancer to combine the second balancing signal with the first signal at a second frequency, the second combiner generating a second balanced signal at the first frequency.

8. (Currently Amended) The apparatus of claim 7 wherein the second balancer comprises:

a second converter to convert the second signal into a second complex conjugate; and

a second multiplier coupled to the second converter to multiply the second complex conjugate with ~~a~~ the second balancing parameter, the second balancing parameter corresponding to the second frequency, the second multiplier generating the second balancing signal.

9. (Original) The apparatus of claim 7 wherein the second combiner includes a second subtractor to subtract the second balancing signal from the first signal to provide the second balanced signal.

10. (Currently Amended) The apparatus of claim 7 wherein the second balanced signal is the same as a second desired signal free of imbalance effects, excluding scaling~~scaled~~ by a second deterministic complex factor.

11. (Original) The apparatus of claim 7 wherein the second signal is provided by a second sub-carrier demodulator operating at the second frequency.

12. (Currently Amended) The apparatus of claim 10 wherein the second desired signal is ~~a second~~an ideally demodulated signal free of imbalance effects.

13. (Currently Amended) The apparatus of claim ~~2~~ 1 wherein the first balancing parameter is a ratio between an output of ~~the~~ a second sub-carrier demodulator and a conjugate output of ~~the~~ a first sub-carrier demodulator when the multi-carrier signal contains a first sub-carrier signal modulated by a non-null complex number and a second sub-carrier signal modulated by a null complex number during ~~a~~ the training process.

14. (Currently Amended) The apparatus of claim ~~8~~ 7 wherein the second balancing parameter is a ratio between an output of ~~the~~ a first sub-carrier ~~demodualtor~~ demodulator and a conjugate output of ~~the~~ a second sub-carrier demodulator when the multi-carrier signal contains a first sub-carrier signal modulated by a null complex number and a second sub-carrier signal modulated by a non-null complex number during ~~a~~ the training process.

15. (Currently Amended) The apparatus of claim 1 wherein the first signal and the second signal are a first desired signal and a second desired signal to be transmitted, respectively~~is a first original signal to be transmitted~~.

16. (Currently Amended) The apparatus of claim ~~1~~ 7 wherein the first balanced signal is provided to a second sub-carrier modulator operating at the second frequency and the second balanced~~desired~~ signal is provided to a first sub-carrier modulator operating at the first frequency.

17. (Currently Amended) The apparatus of claim 16 ~~further comprising~~wherein:

the first combiner includes a first subtractor coupled to the first balancer to subtract the first~~a second balancer to generate a second~~ balancing signal from the second signal at a first frequency, the first subtractor generating the first balanced signal at the second frequency; and

the second combiner including a second subtractor coupled to the second balancer to subtract the second balancing signal from the first signal at a second frequency, the second subtractor generating ~~a~~ the second balanced signal at the first frequency.

18. (Currently Amended) The apparatus of claim 17 further wherein:
the first balancer comprises:

a first converter to convert the first signal into a first complex conjugate; and

a first multiplier coupled to the first converter to multiply the first complex conjugate with the first balancing parameter, the first balancing parameter corresponding to the first frequency, the first multiplier generating the first balancing signal;
and the second balancer comprises:

a second converter to convert the second signal into a second complex conjugate; and

a second multiplier coupled to the second converter to multiply the second complex conjugate with a second balancing parameter, the second balancing parameter corresponding to the second frequency, the second multiplier generating the second balancing signal.

19. (Currently Amended) The apparatus of claim ~~17~~ 18 wherein the first balanced signal and the second balanced signal are a first pre-distorted signal and a second pre-distorted signal, respectively~~is a second desired signal scaled by a second complex factor~~.

20. (Currently Amended) The apparatus of claim 19 wherein the first pre-distorted signal and the second pre-distorted signal are~~second desired signal is~~ provided to a second sub-carrier modulator operating at the second frequency and a first sub-carrier modulator operating at the first frequency, respectively.

21. (Canceled)

22. (Currently Amended) The apparatus of claim ~~21~~ 20 wherein the first balancing parameter is derived from outputs of first and second ideal sub-carrier demodulators operating at first and second frequencies when the multi-carrier signal is generated from the first and second sub-carrier modulators ~~receiving~~ modulated by the first and second desired signal, the first desired signal being a non-null complex number and the second desired signal being a null complex number during the training process.

23. (Currently Amended) The apparatus of claim ~~21~~ 20 wherein the second balancing parameter is derived from outputs of first and second ideal sub-carrier demodulators operating at first and second frequencies when the multi-carrier signal is generated from the first and second sub-carrier modulators ~~receiving~~ modulated by the first and second desired signal, the first desired signal being a null complex number and the second desired signal being a non-null complex number during the training process.

24. (Currently Amended) A method comprising:

calculating a first balancing parameter in a training process;

generating a first balancing signal from a first balancing parameter and a first signal of a first index corresponding to a first frequency using a first balancer, the first signal being provided by a first sub-carrier demodulator operating at the first frequency; and

combining the first balancing signal and a second signal of a second index corresponding to a second frequency using a first combiner, the second signal being provided by a second sub-carrier demodulator operating at the second frequency and the second frequency being symmetrical to the first frequency with respect to a center frequency in a multi-carrier signal, the first combiner generating a first balanced signal corresponding to the second frequency.

25. (Currently Amended) The method of claim 24 wherein generating a first balancing signal comprises:

converting the first signal into a first complex conjugate by a first converter; and

multiplying the first complex conjugate with ~~a~~ the first balancing parameter by a first multiplier, the first balancing parameter corresponding to the first frequency, the first multiplier generating the first balancing signal.

26. (Original) The method of claim 24 wherein the first combiner includes a first subtractor to subtract the first balancing signal from the second signal to provide the first balanced signal.

27. (Currently Amended) The method of claim 24 wherein the first balanced signal is the same as a first desired signal free of imbalance effects, excluding scaling~~scaled~~ by a first deterministic complex factor.

28. (Canceled)

29. (Currently Amended) The method of claim ~~28~~ 27 wherein the first desired signal is a first ideally demodulated signal free of imbalance effects.

30. (Currently Amended) The method of claim 29 further comprising:

calculating a second balancing parameter in a training process;

generating a second balancing signal from a second balancing parameter and the second signal using a second balancer; and

combining the second balancing signal with the first signal at a second frequency using a second combiner, the second combiner generating a second balanced signal at the first frequency.

31. (Currently Amended) The method of claim 30 wherein generating the second balancing signal comprises:

converting the second signal into a second complex conjugate by a second converter; and

multiplying the second complex conjugate with ~~a~~ the second balancing parameter by a second multiplier, the second balancing parameter corresponding to the second frequency, the second multiplier generating the second balancing signal.

32. (Original) The method of claim 30 wherein the second combiner includes a second subtractor to subtract the second balancing signal from the first signal to provide the second balanced signal.

33. (Currently Amended) The method of claim 30 wherein the second balanced signal is the same as a second desired signal free of imbalance effects, excluding scaling~~scaled~~ by a second deterministic complex factor.

34. (Canceled)

35. (Currently Amended) The method of claim ~~34~~ 33 wherein the second desired signal is a second ideally demodulated signal free of imbalance effects.

36. (Currently Amended) The method of claim ~~30~~ 24 wherein calculating the first balancing parameter ~~is~~ results in a complex number derived from outputs of the first and second sub-carrier demodulators when the received multi-carrier signal contains ~~the~~ a first sub-carrier signal modulated by a non-null complex number and ~~the~~ a second sub-carrier signal modulated by a null complex number during ~~a~~ the training process.

37. (Currently Amended) The method of claim 30 wherein calculating the second balancing parameter ~~is~~ results in a complex number derived from outputs of the first and second sub-carrier demodulators when the received multi-carrier signal contains ~~the~~ a first sub-carrier signal modulated by a null complex number and ~~the~~ a second sub-carrier signal modulated by a non-null complex number during ~~a~~ the training process.

38. (Currently Amended) ~~The method of claim 26 wherein the first signal is a first original signal to be transmitted.~~ A method comprising:

calculating a first balancing parameter in a training process;

generating a first balancing signal from a first balancing parameter and a first signal of a first index corresponding to a first frequency using a first balancer, the first signal being a first desired signal to be transmitted;

and combining the first balancing signal and a second signal of a second index corresponding to a second frequency using a first combiner, the second frequency being symmetrical to the first frequency with respect to a center frequency in a multi-carrier signal, the first combiner generating a first balanced signal corresponding to the second frequency.

39. (Currently Amended) The method of claim 38 wherein the first ~~desired~~ balanced signal is provided to a ~~first~~ sub-carrier modulator operating at the ~~first~~ second frequency.

40. (Currently Amended) The method of claim ~~39~~ 38 further comprising:

generating a second balancing signal from the second signal by a second balancer; and

~~subtracting~~ combining the second balancing signal ~~from~~ and the first signal at a second frequency by a second ~~subtractor~~combiner, the second ~~subtractor~~ combiner generating a second balanced signal at the first frequency.

41. (Currently Amended) The method of claim 40 wherein generating the first and second balancing ~~signal~~ signals comprises:

converting the first signal into a first complex conjugate by a first converter; multiplying the first complex conjugate with a first balancing parameter by a first multiplier, the first balancing parameter corresponding to the first frequency, the first multiplier generating the first balancing signal;

converting the second signal into a second complex conjugate by a second converter; and

multiplying the second complex conjugate with a second balancing parameter by a second multiplier, ~~the~~ a second balancing parameter corresponding to the second frequency, the second multiplier generating the second balancing signal.

42. (Currently Amended) The method of claim ~~40~~ 41 wherein the second ~~balanced~~ signal is a second desired signal ~~scaled by a second complex factor~~to be transmitted.

43. (Currently Amended) The method of claim ~~42~~ 40 wherein the second ~~desired~~ balanced signal is provided to a ~~second~~ sub-carrier modulator operating at the ~~second~~ first frequency.

44. (Canceled)

45. (Currently Amended) The method of claim ~~44~~ 42 wherein the first balancing parameter is derived from outputs of first and second ideal sub-carrier demodulators operating at first and second frequencies when the multi-carrier signal is generated from ~~the first and second~~a sub-carrier modulator operating at the first frequency and a sub-carrier modulator operating at the second frequency being modulated by~~modulators receiving~~ the first and second desired

~~modulating signal~~signals, respectively, the first desired signal being a non-null complex number and the second desired signal being a null complex number during the training process.

46. (Currently Amended) The method of claim ~~44~~ 42 wherein the second balancing parameter is derived from outputs of first and second ideal sub-carrier demodulators operating at first and second frequencies when the multi-carrier signal is generated from ~~the first and second~~a sub-carrier modulator operating at the first frequency and a sub-carrier modulator operating at the second frequency being modulated by~~modulators receiving~~ the first and second desired signals, respectively~~modulating signal~~, the first desired signal being a null complex number and the second desired signal being a non-null complex number during the training process.

47. (Currently Amended) A system comprising:

in-phase (I) and quadrature (Q) processing chains to generate I and Q samples from a multi-carrier signal having ~~P~~ 2P sub-carrier signals at ~~P~~ 2P carrier frequencies;

a bank of demodulators coupled to the I and Q processing chains to demodulate the ~~P~~ 2P sub-carrier signals, the bank of demodulators generating ~~P~~ 2P demodulated signals; and

a balancing unit coupled to the bank of demodulators to restore ~~P~~ 2P original signals from the ~~P~~ 2P demodulated signals, the balancing unit including P basic blocks, each of the basic blocks being coupled to a pair of the demodulators called the first and second sub-carrier demodulators of the basic block and comprising:

a first balancer to generate a first balancing signal from a first signal at a first frequency, and

a first ~~subtractor~~ combiner coupled to the first balancer to ~~subtract~~ combine the first balancing signal ~~from~~ and a second signal at a second frequency, the second frequency being symmetrical to the first frequency with respect to a center frequency in the multi-carrier signal, the first ~~subtractor~~ combiner generating a first balanced signal at the second frequency.

48. (Original) The system of claim 47 wherein the first balancer comprises:

a first converter to convert the first signal into a first complex conjugate; and

a first multiplier coupled to the first converter to multiply the first complex conjugate with a first balancing parameter, the first balancing parameter corresponding to the first frequency, the first multiplier generating the first balancing signal.

49. (Original) The system of claim 47 wherein the first combiner includes a first subtractor to subtract the first balancing signal from the second signal to provide the first balanced signal.

50. (Original) The system of claim 47 wherein the first balanced signal is a first desired signal scaled by a first complex factor.

51. (Original) The system of claim 50 wherein the first signal is provided by a first sub-carrier demodulator operating at the first frequency.

52. (Currently Amended) The system of claim 51 wherein the first desired signal is a first ~~demodulated~~ original signal.

53. (Original) The system of claim 52 wherein each of the basic blocks further comprising:

a second balancer to generate a second balancing signal from the second signal; and

a second combiner coupled to the second balancer to combine the second balancing signal with the first signal at a second frequency, the second combiner generating a second balanced signal at the first frequency.

54. (Original) The system of claim 53 wherein the second balancer comprises:

a second converter to convert the second signal into a second complex conjugate; and

a second multiplier coupled to the second converter to multiply the second complex conjugate with a second balancing parameter, the second balancing parameter corresponding to the second frequency, the second multiplier generating the second balancing signal.

55. (Original) The system of claim 53 wherein the second combiner includes a second subtractor to subtract the second balancing signal from the first signal to provide the second balanced signal.

56. (Original) The system of claim 53 wherein the second balanced signal is a second desired signal scaled by a second complex factor.

57. (Original) The system of claim 56 wherein the second signal is provided by a second sub-carrier demodulator operating at the second frequency.

58. (Currently Amended) The system of claim 57 wherein the second desired signal is a second ~~demodulated~~ original signal.

59. (Currently Amended) The system of claim ~~53~~ 48 wherein the first balancing parameter is derived from outputs of the first and second sub-carrier demodulators when the multi-carrier signal contains ~~the~~ a first sub-carrier signal modulated by a non-null complex number and ~~the~~ a second sub-carrier signal modulated by a null complex number during a training process.

60. (Currently Amended) The system of claim ~~53~~ 54 wherein the second balancing parameter is derived from outputs of the first and second sub-carrier demodulators when the ~~training~~ multi-carrier signal contains ~~the~~ a first sub-carrier signal modulated by a null complex number and ~~the~~ a second sub-carrier signal modulated by a non-null complex number during a training process.

61. (Currently Amended) ~~The system of claim 49 wherein the first signal is a first original signal to be transmitted.~~ A system comprising:

in-phase (I) and quadrature (Q) processing chains using I and Q samples to generate a multi-carrier signal having 2P sub-carrier signals at 2P carrier frequencies;

a bank of 2P modulators generating 2P modulated signals of the 2P sub-carriers and the resulting I and Q samples to feed the I and Q processing chains; and

a balancing unit generating 2P pre-distorted signals from 2P desired signals and using the 2P pre-distorted signals to modulate the 2P sub-carriers of the bank of 2P modulators, the balancing unit including P basic blocks, each of the basic blocks being coupled to a pair of the modulators called the first and second sub-carrier modulators of the basic block and comprising: a first balancer to generate a first balancing signal from a first signal at a first frequency, and a first combiner coupled to the first balancer to combine the first balancing signal and a second signal at a second frequency, the second frequency being symmetrical to the first frequency with respect to a center frequency in the multi-carrier signal, the first combiner generating a first balanced signal at the second frequency.

62. (Currently Amended) The system of claim 61 wherein the first signal is a first desired signal to be transmitted and the first balanced signal is the first pre-distorted signal provided to ~~a first~~the second sub-carrier modulator operating at the ~~first~~ second frequency.

63. (Currently Amended) The system of claim ~~62~~ 61 further comprising:

a second balancer to generate a second balancing signal from the second signal; and

a second ~~subtractor~~ combiner coupled to the second balancer to subtract the second balancing signal from the first signal at a second frequency, the second ~~subtractor~~ combiner generating ~~a~~ the second balanced signal at the first frequency.

64. (Currently Amended) The system of claim ~~63 wherein the second balancer comprises~~61 further comprising:

a first converter to convert the first signal into a first complex conjugate;

a first multiplier coupled to the first converter to multiply the first complex conjugate with a first balancing parameter, the first balancing parameter corresponding to the first frequency, the first multiplier generating the first balancing signal;

a second converter to convert the second signal into a second complex conjugate; and

a second multiplier coupled to the second converter to multiply the second complex conjugate with a second balancing parameter, the second balancing parameter corresponding to the second frequency, the second multiplier generating the second balancing signal.

65. (Currently Amended) The system of claim ~~63~~ 62 wherein the second ~~balanced~~ signal is a second desired signal ~~scaled by a second complex factor~~to be transmitted.

66. (Currently Amended) The system of claim ~~65~~ 63 wherein the second balanced signal is the second pre-distorted signal provided to the first~~desired signal is provided to a second~~ sub-carrier modulator operating at the ~~second~~ first frequency.

67. (Currently Amended) The system of claim ~~66~~ 64 wherein ~~one of~~ the first and second balancing parameters ~~is~~ are obtained during a training process.

68. (Currently Amended) The system of claim 67 wherein the first balancing parameter is derived from outputs of first and second sub-carrier ideal demodulators operating at first and second frequencies when the multi-carrier signal is generated from the first and second sub-carrier modulators ~~receiving~~ modulated by the first and second desired modulating ~~signal~~signals, the first desired signal being a non-null complex number and the second desired signal being a null complex number during the training process.

69. (Currently Amended) The system of claim 67 wherein the second balancing parameter is derived from outputs of first and second sub-carrier ideal demodulators operating at first and second frequencies when the ~~training~~ multi-carrier signal is generated from the first and second sub-carrier modulators ~~receiving~~ modulated by the first and second desired modulating ~~signal~~signals, the first desired signal being a null complex number and the second desired signal being a non-null complex number during the training process.

70. (Original) The apparatus of claim 1 wherein at least one of the first and second indices corresponds to a zero index.

71. (Currently Amended) The apparatus of claim 70 wherein at least one of the first and second signals corresponds to one of the center frequency and a DC of a baseband signal of the ~~multi-receiver~~multi-carrier signal.